

CASE REPORT

Valve-sparing aortic root reconstruction in patient with prior renal transplantation

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Key Clinical Message

We describe a David operation in a 62-year-old renal transplant recipient with valsalva aneurysm and concomitant aortic insufficiency. The risk of postoperative infection seemed significant because he was receiving immunosuppressive therapy; thus, David operation was performed. He recovered uneventfully. David operation appears to be an attractive alternative in transplant recipients.

Keywords

Aortic insufficiency, david operation, recipient, reimplantation, renal transplant, valsalva aneurysm.

Introduction

Advances in transplantation medicine have improved the survival of renal transplant recipients. With this improved survival, there are an increasing number of patients with previous renal transplantation who require cardiac surgery [1]. Postoperative infection is one of the most important complications of cardiac surgery in renal transplant recipients. Furthermore, renal transplant recipients with prosthetic heart valves are reportedly at increased risk of developing bacterial endocarditis [2, 3]. Consequently, a valve-sparing operation can be an attractive alternative for such patients. Although numerous case reports on cardiac surgery after renal transplantation have been published, there are no reports on valve-sparing aortic root reconstruction in patients who have undergone prior renal transplantation. We herein report a successful case of valve-sparing aortic root reconstruction in a renal transplant recipient with a 58-mm aortic root aneurysm and concomitant aortic regurgitation.

Case Report

A 62-year-old man had undergone renal transplantation at 47 years of age to treat end-stage renal failure caused by polycystic kidney disease. Renal transplant rejection

was being suppressed with methylprednisolone, mycophenolate mofetil, and cyclosporine (4, 1000, and 125 mg/day, respectively). He was admitted to our institute for treatment of an aortic root aneurysm complicated by aortic regurgitation. Preoperative computed tomography showed a 58-mm aortic root aneurysm and a 45-mm dilated ascending aorta. Echocardiography revealed preserved left ventricular function with an ejection fraction of 0.61, a trileaflet aortic valve, and moderate aortic insufficiency (Fig. 1). Coronary artery angiography showed normal coronary anatomy with no stenotic lesions. The preoperative serum creatinine level was 1.01 mg/dL, and the estimated glomerular filtration rate was 59 mL/min per 1.73 m². We elected to perform valve-sparing root reconstruction to reduce the risk of postoperative infectious complications. Oral immunosuppressive medications were continued until the morning of the surgery. Vancomycin (1 g) and methylprednisolone (125 mg) were administered at the time of surgery.

The patient underwent a valve-sparing reimplantation procedure and ascending aortic replacement without circulatory arrest. Cardiopulmonary bypass was instituted between the aortic arch and the right atrium. The aortic cross-clamp was placed just proximal to the innominate artery. Cardiopulmonary bypass was conducted under mild hypothermia (33°C) with a target hematocrit of

25%. A pump flow of 2.5 L/min per m² and a mean arterial pressure of >60 mmHg were maintained to ensure adequate perfusion and protection of the transplanted kidney. Furosemide was administered during the surgery to encourage diuresis. The aortic root was replaced with a 26-mm Vascutek Valsalva graft (Terumo Cardiovascular Systems, Ann Arbor, MI) with 12 2-0 pledgeted polyester mattress sutures in the first row and continuous 5-0 polypropylene sutures in the second row. Next, the coronary anastomoses were completed using 5-0 polypropylene sutures. Finally, distal anastomosis was completed with continuous 4-0 polypropylene sutures. The cross-clamp time was 175 min, and the cardiopulmonary bypass time was 202 min. Intraoperative transesophageal echocardiography showed no residual aortic regurgitation.

The patient's postoperative recovery was uneventful. Methylprednisolone, mycophenolate mofetil, and cyclosporine were administered orally the day after surgery. Computed tomography and echocardiography performed before discharge showed a successful aortic root reconstruction and no aortic regurgitation (Fig. 2). On postoperative day 13, the patient was discharged home with preservation of his renal function (serum creatinine,

0.99 mg/dL). Medical examination 4 months after the surgery revealed no valve-related complications.

Discussion

Although the survival of renal transplant recipients who undergo cardiac surgery has improved [4–6], the cardiac surgery for these patients is still challenging. The risk of postoperative infectious complications is a particularly important issue in patients undergoing permanent immunosuppression therapy. A high infection rate after surgery has been noted in previous reports [4, 5]. Infectious complications are very important not only in the short term, but also in the long term. Sharma et al. reported that the estimated hospitalization rate for endocarditis was 5 per 100 patient-years among renal transplantation patients with tissue valves in an analysis of the United States Renal Data System database [2]. This is much higher than the incidence of endocarditis (2.72 per 1000 patient-years) in the entire population of renal transplantation patients [3]. In the present case, the patient had been under long-term immunosuppressive therapy and had a history of repeated

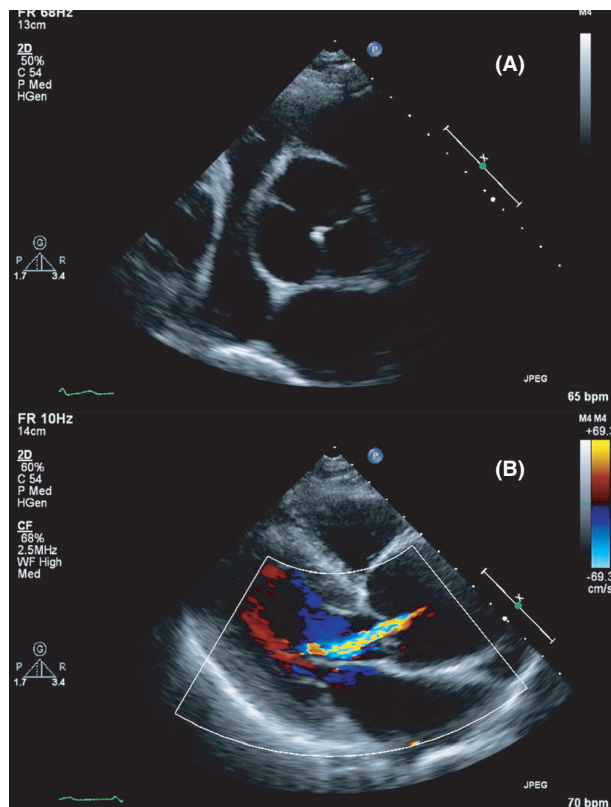


Figure 1. (A) Preoperative transthoracic echocardiography demonstrated a trileaflet aortic valve with a dilated Valsalva sinus and (B) moderate aortic insufficiency.

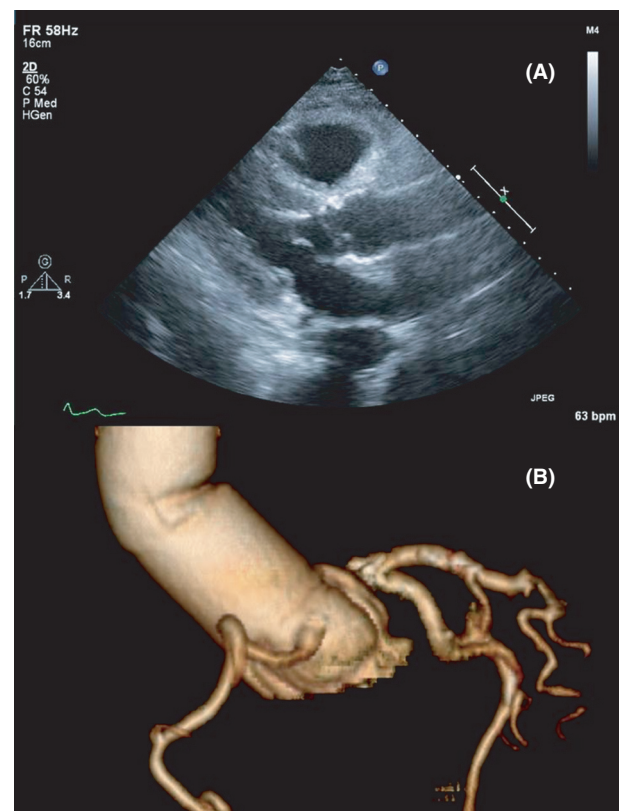


Figure 2. (A) Postoperative transthoracic echocardiography demonstrated normal aortic valve function. (B) Postoperative computed tomographic angiography shows the adequate shape of the neosinuses of Valsalva.

infection, including cellulitis and respiratory tract infection. Therefore, it was even more important to reduce the risk of postoperative infection in his case.

Immunosuppressive therapy is associated with another problem, which is the interaction between warfarin and immunosuppressants such as cyclosporine or tacrolimus. This can make it difficult to achieve proper anticoagulation in patients undergoing immunosuppressive therapy. In addition, inadequate anticoagulation can cause hemorrhagic or thromboembolic complications. Further, renal transplantation patients with immunosuppression secondary to steroids might be expected to be more susceptible to the risk of gastrointestinal hemorrhagic. The present patient had been taking cyclosporine and methylprednisolone. This supported our decision to perform a valve-sparing surgery to avoid postoperative anticoagulation.

Although the Bentall operation is an established treatment for aortic root aneurysm [7], the use of prosthetic valve has a risk of valve-related complication. David *et al.* reported that valve-sparing surgery was associated with a low incidence of valve-related complications, including infective endocarditis, in the general population and that the incidence was lower than that reported for valve replacement [8]. Sharma *et al.* reported that the overall risk of mortality was significantly lower in patients who received tissue valves than in those who received nontissue valves (hazard ratio, 0.83; 95% confidence interval, 0.70–0.99) in a propensity-adjusted Cox model [2]. Based on the above results, valve-sparing surgery appears to be able to provide better clinical outcomes in the treatment of renal transplant recipients with Valsalva aneurysm. However, to our knowledge, there are no previous reports on valve-sparing surgery patients who have undergone prior renal transplantation. Further investigation of the long-term outcome of valve-sparing surgery in patients with prior renal transplantation is required to establish a sound treatment strategy for such patients.

Conclusion

Valve-sparing root replacement could be performed in the renal transplant patient without serious complications, including postoperative infection and allograft failure.

This procedure appears to be an attractive option for the treatment of Valsalva aneurysms in such patients who are taking immunosuppressive agents after organ transplantation.

Conflict of Interest

None declared.

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